

# **Olivier GOURDON**

## Professional Address

Neutron Scattering Division  
Oak Ridge National Laboratory  
Building 8600  
Oak Ridge, Tennessee 37931  
U.S.A  
Tel : 865-576-6629  
Fax : 865-241-5991  
e-mail : gourdonoa@ornl.gov

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## **Crystallographer - PhD in Solid State Chemistry-Material Chemistry**

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### **EXPERIENCE**

- Feb 2008 – Present:*      Instrument Scientist on the neutron powder diffractometer (POWGEN) for the Juelich Neutron Center Science (JCNS) at the Spallation Neutron Source (SNS) at Oak Ridge National Laboratory (ORNL). Ph.D supervisor of one graduate student.  
Interests: Magneto caloric effect materials, Modulated structures, incommensurate nuclear and/or magnetic structures and Pair Distribution Functions.
- Aug. 2004 – Jan. 2008:*      Postdoctoral position in solid state chemistry at the Los Alamos National Laboratory-LANSCE division (Los Alamos Neutron Science Center). (Supervisor: Sven Vogel)  
Objective: Experimental and theoretical studies of magnetic structures and hydrogen storage materials.
- Oct. 2000 – Aug. 2004:*      Postdoctoral position in solid state chemistry at the Chemistry Department of Iowa State University (Supervisor: Prof. Gordon J. Miller)  
Objective: Experimental and theoretical studies on the properties of quasicrystal approximants compounds and magnetic frustrations.
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### **EDUCATION**

- Sept. 1997 - Oct 2000 :*      **Ph.D.** in Structural Chemistry at the Institut des Matériaux Jean Rouxel (Nantes, France), Solid State Chemistry laboratory. Supervisor: Prof. Michel Evain  
Objective : Structures and properties of modulated structures.
- 1996 - 1997 :*      Military Service
- 1995 - 1996 :*      **DEA** (postgraduate degree, prerequisite to doctoral studies) in **Advanced Solid State Chemistry** (with distinction)
- 1994 - 1995 :*      **Maîtrise (M. Sc.) in Physical Chemistry**
- June 1991 :*      **Baccalauréat**
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### **SKILLS**

**Synthesis Processes:** Solid state reactions (glass work, arc welding,...) and crystal growth technique.

**Structural characterisations:** X-ray and neutron Powder Diffraction (Refinement using Full Pattern and Rietveld method, Pair Distribution Function analysis).

X-Ray Single crystal diffraction (superspace group description for the modulated structures and non-harmonic development of the atomic displacement parameters). Collaboration with Bruker Inc. (USA) (Software development for incommensurate modulated structures).

User and in charge of the X-ray and neutron equipment (Siemens P4, CAD 4, Bruker Smart system, Stoe Image Plate)

Neutron instruments: Pharos, NPDF, HIPD and HIPPO at LANSCE; POWGEN, Sequoia and ARCS at SNS and HB2a and HB3 at HFIR.

**Physical & Chemical characterizations :**

DSC, DTA  
EDXS Analysis

**Ab initio band structure calculation:** LMTO-ASA (LMTO47 code & LMTO48 code)  
FLAPW (WIEN code)

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**TEACHING EXPERIENCE AT THE UNIVERSITE DE NANTES**

- Practical work supervising undergraduates (1997 - 1998)

- ✓ pH-metry, complexometry, oxido-reduction
- ✓ cristallography

- Tutoring of undergraduate students:

Six undergraduates students (1997-1998)

One DEA student (1999 – 2000)

**TEACHING EXPERIENCE AT IOWA STATE UNIVERSITY**

- Graduate course on the aperiodic order in the crystal (2000-2003)

**TEACHING EXPERIENCE AT OAK RIDGE**

- Ph.D. Student on MagnetoCaloric Effect Materials (2008-2011)

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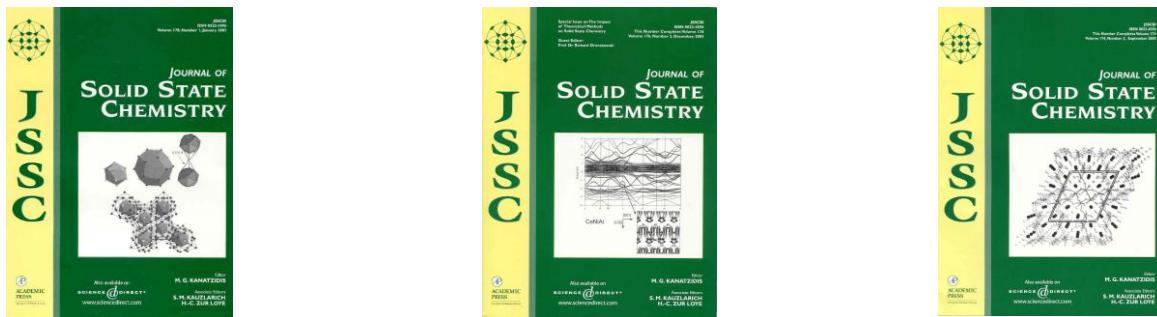
**SCIENTIFIC WORK**

⇒**Publications**

1. An experimental and Theoretical study of MnFe<sub>4</sub>Si<sub>3</sub>: Toward a better understanding of the MagnetoCaloric Effect (MCE) Material. M. GOTTSCHLICH, O. GOURDON, M. OHL, J. PERSSON, M. MCGUIRE, C. DE LA CRUZ, V. PETRICEK AND T. BRUECKEL (2011) *J. Appl. Phys.*. In preparation.
2. Understanding the Role of Oxygen Vacancies in the Battery Performance of Lithium Manganospinel Nanoparticles Synthesized by Hydrothermal Methods (2011) X. HAO, B. LIDDLE, O. GOURDON and B. M. BARTLETT *J. Am. Chem. Soc.* Submitted.

3. Reinvestigation of the Antiferromagnetic Structures in  $Mn_5Si_3$ : Inverse Magnetocaloric Effect Material. M. GOTTSCHLICH, O. GOURDON, M. OHL, J. PERSSON, C. DE LA CRUZ, V. PETRICEK AND T. BRUECKEL (2011) *Chem. Mat.* Submitted.
4. POWGEN: A third-generation high-resolution high-throughput powder diffraction instrument at the Spallation Neutron Source. A. HUQ, .P. HODGES, O. GOURDON and L. HEROUX (2011) *Z Kristallogr. Proc. 1*, 127.
5. Rhombohedrally Distorted  $\gamma$ -Brasses  $Cr_xFe_{1-x}Ga$ : Crystallographic, Magnetic and Electronic Structure Relationships. H. KO, O. GOURDON, D. GOUT, E.-D. MUN and G. J. MILLER (2010) *Inorg. Chem.* 49, 11505.
6.  $BaHg_2Tl_2$ . An Unusual Polar Intermetallic Phase with Strong Differentiation Between the Neighboring Elements Mercury and Thallium. J.-C. DAI, S. GUPTA, O. GOURDON, H.-J. KIM and J. D. CORBETT (2009) *J. Am. Chem. Soc.*, 131 (24), 8677–8682.
7. Structure Determination of Two Modulated  $\gamma$ -Brass Structures in the Zn-Pd System through a (3+1)-Dimensional Space Description. O. GOURDON, Z. IZAOLA, L. ELCORO, V. PETRICEK and G. J. MILLER (2009) *Inorg. Chem.*, 48 (20) 9715.
8. To What Extent Does the Zintl-Klemm Formalism Work? The  $Eu(Zn_{1-x}Ge_x)_2$  Series. T.-S. YOU, S. LIDIN, O. GOURDON, Y. WU and G. J. MILLER (2009) *Inorg. Chem.*, 48, 6380-6390.
9. Experimental and Theoretical Studies of the Itinerant-localized duality of 4f-electron in  $CeIn_3$ . D. GOUT, O. GOURDON, E. BAUER, J. D. THOMPSON and T. PROFFEN, (2008) *Inorg. Chem.*, 47 (7); 2569-2575.
10. Atomic Distributions in the  $\gamma$ -Brass Structure of the Cu-Zn System: A Structural and Theoretical Study O. GOURDON, D. GOUT, D. J. WILLIAMS, T. PROFFEN, S. HOBBS and G. J. MILLER (2007) *Inorg. Chem.*, 46, 251-260.
11. The “Coloring Problem” in the Cu-Zn  $\gamma$ -brass Structure D. GOUT, O. GOURDON, G. J. MILLER and T. PROFFEN, LANSCE Activity report 2006.
12. Intergrowth Compounds in the Zn-Rich Zn-Pd System: Toward 1D Quasicrystal Approximants. O. GOURDON and G. J. MILLER (2006) *Chem. Mat.* , 18(7) 1848-1856.
13.  $Zn_{1-x}Pd_x$  ( $x=0.14$  to  $0.24$ ): A Missing Link Between Intergrowth Compounds And Quasicrystal Approximants O. GOURDON , Z. IZAOLA, L. ELCORO, V. PETRICEK and G. J. MILLER (2006) *Phil. Mag.* 86(3-5) 419-426.
14. A New Superstructure for the  $BaAl_4$ -Structure Type: An Experimental and Theoretical Study of  $La_2NiAl_7$  D. GOUT, T. J. BARKER, O. GOURDON and G. J. MILLER *Chem. Mater.*; (2005); 17(14); 3661-3667.

15. Composition-structure relationships in polar intermetallics: Experimental and theoretical studies of of  $\text{LaNi}_{1+x}\text{Al}_{6-x}$  ( $x=0.44$ ).  
D. GOUT, E. BENBOW, O. GOURDON and G. J. MILLER (2004) *Inorg. Chem.*, 43(15), 4604-4609.
16. Crystallographic, Electronic and Magnetic Studies of  $\zeta_2\text{-GaM}$  ( $M = \text{Cr, Mn or Fe}$ ): Trends in Itinerant Magnetism.  
O. GOURDON, S. BUD'KO, D. WILLIAMS and G. J. MILLER (2004) *Inorg. Chem.*, 43(10), 3210-3218.
17. Theoretical Studies of Polar Intermetallic and Heavy Fermion Behavior in Ternary Cerium Nickel Aluminides.  
D. GOUT, E. BENBOW, O. GOURDON and G. J. MILLER (2003) *J. Solid State Chem.*, 176(2), 538-548.
18. Crystallographic, electronic and magnetic studies of  $\text{Ce}_4\text{Ni}_6\text{Al}_{23}$ : a new ternary intermetallic compound in the cerium–nickel–aluminum phase diagram.  
D. GOUT, E. BENBOW, O. GOURDON and G. J. MILLER (2003) *J. Solid State Chem.*, 174(2) 471-481.



19. Reinvestigation of the GaMn Structure and Theoretical Studies of its Electronic and Magnetic Properties.  
O. GOURDON and G. J. MILLER (2003) *J. Solid State Chem.*, 173(1) 137-147.
20. Influence of the metal-metal sigma bonding on the magnetic properties and the structural features in the hexagonal perovskite-type sulfides of the  $\text{Sr}_x\text{TiS}_3$  family. Crystal structure determination of  $\text{Sr}_{8/7}\text{Ti}_{6/7}\text{Fe}_{1/7}\text{S}_3$ .  
O. GOURDON, E. JEANNEAU, M. EVAIN, S. JOBIC, R. BREC, H.-J. KOO and M.-H. WHANGBO (2001) *J. Solid State Chem.*, 162(1) 103-112.
21. Synthesis and structure determination of two new composite compounds in the hexagonal perovskite-like sulfide family:  $\text{Eu}_{8/7}\text{TiS}_3$  and  $\text{Sr}_{8/7}\text{TiS}_3$ .  
O. GOURDON, L. CARIO, V. PETRICEK and M. EVAIN, (2001) *Z Kristallogr.*, 216(10), 541-550.
22. On the Structural and Electronic Factors Governing the Magnetic Properties of the Hexagonal Perovskite-Type Oxides  $A_x\text{BO}_3$  ( $A=\text{Ca, Sr, Ba}; B=\text{Co, Ni}$ )  
M.-H. WHANGBO, H.-J. KOO, K.-S. LEE, O. GOURDON, M. EVAIN, S. JOBIC and R. BREC, (2001) *J. Solid State Chem.*, 160(1), 239-246.
23. The use of crenel functions in the description of the hexagonal perovskite-like  $A_{1+x}\text{BX}_3$  oxides and sulfides

M. EVAIN, O. GOURDON and V. PETRICEK, (2001) *Ferroelectrics* 250 (1-4), 53-58.

24. On the origin of the  $\sqrt{7} \times \sqrt{7}$  superstructure and the anomalous magnetic and transport properties of the layered compound  $\text{Sr}_6\text{V}_9\text{S}_{22}\text{O}_2$

O. GOURDON, M. EVAIN, S. JOBIC, R. BREC, H.-J. KOO, M.-H. WHANGBO, B. CORRAZE and O. CHAUVET, (2001) *Inorganic Chemistry* 40(12), 2898-2904.

25. A new structural type in the hexagonal perovskite family. Structure determination of the commensurately modulated misfit compound  $\text{Sr}_{9/8}\text{TiS}_3$

O. GOURDON, V. PETRICEK and M. EVAIN, (2000) *Acta Cryst. B* 56, 409-418.

26. A unique distortion in  $\text{K}_{1/3}\text{Ba}_{2/3}\text{AgTe}_2$ . X-ray diffraction determination and electronic band structure analysis of its incommensurately modulated structure

O. GOURDON, JASON HANKO, F. BOUCHER, V. PETRICEK, M.-H. WHANGBO, M. G. KANATZIDIS and M. EVAIN, (2000) *Inorganic Chemistry* 7, 1398-1409.

27. Determination of the modulated structure of  $\text{Sr}_{14/11}\text{CoO}_3$  through a (3+1)-dimensional space description and using non-harmonic ADPs

O. GOURDON, V. PETRICEK, M. DUSEK, P. BEZDICKA, S. DUROVIC, D. GYEPESOVA and M. EVAIN (1999), *Acta Cryst. B* 55, 841-848.

28. Incommensurate versus commensurate description of the  $A_x\text{BX}_3$  hexagonal perovskite-type structure. The  $\text{Sr}_{1.2872}\text{NiO}_3$  incommensurate composite compound example

M. EVAIN, F. BOUCHER, O. GOURDON, V. PETRICEK, M. DUSEK and P. BEZDICKA (1998) *Chem. Mater.* 10, 3068-3076.

29. Synthesis and Crystal Structure of the Pseudo-Hollandite  $\text{Rb}_{0.62}\text{Cr}_5\text{Te}_8$  and Analysis of the Electronic Band Structures of the  $\text{Rb}_x\text{Cr}_5\text{Te}_8$  Phases

F. BOUCHER, J. GAREH, O. GOURDON, M. EVAIN (1997) *J. Solid State Chem.*, 131, 326-334.

30. Rubidium Indium Antimonide,  $\text{Rb}_2\text{In}_2\text{Sb}_3$

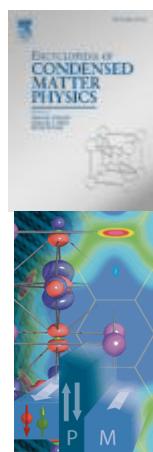
O. GOURDON, F. BOUCHER, J. GAREH, M. EVAIN, C. O'CONNOR, J. JIN-SEUNG, (1996) *Acta Cryst. C* 52, 2963-2964.

## ⇒Book Chapters

1. *Electronic Structure: Electronic States of Intermetallic compounds*. Encyclopedia of Condensed Matter Physics. Elsevier (**2005**).

O. GOURDON, D. GOUT, and G. J. MILLER (**2005**).

2. *Magneto Caloric effect materials: Electronic Oxides: Correlation Phenomena, Exotic Phases, and Novel Functionalities*. (**2010**).



⇒**Oral Communications**

1. *Invited talk entitled “JANA2006 as a unique tool to refine nuclear and/or magnetic structures using ToF data, O. Gourdon, XXII International Congress and General Assembly of the International Union of Crystallography, Madrid (Spain), August 27<sup>th</sup> 2011.*
2. *Invited talk entitled “Crystal as weird as they come: From Disorder to long range ordering” Seminar series, Condensed Matter Department, University of Tennessee, Knoxville. January 12<sup>th</sup>, 2010*
3. *Invited talk entitled “Magneto Caloric Effect Materials”- O. Gourdon. Electronic Oxides-Correlation Phenomena, Exotic Phases and Novel Functionalities **41<sup>st</sup> IFF Springschool 2010**.*
4. *Invited talk entitled “Unique Atomic Distribution in Polar Intermetallic Compounds” O. Gourdon. **American Conference on Neutron Scattering Ottawa, ON, Canada June 26 - 30, 2010.***
5. *Session Chair of the session entitled “Incommensurately Modulated Structures” at the 2010 meeting of the **American Crystallographic Association**, Chicago, IL July 24-29, 2010.*
6. *Invited talk entitled “Crystal as weird as they come: From Disorder to long range ordering” 2010 meeting of the **American Crystallographic Association**, Chicago, IL July 24-29, 2010.*
7. *Invited talk entitled « Une nouvelle génération de sources de neutrons pulsées par spallation pour une meilleure compréhension de la matière et de ses propriétés : L'exemple de SNS à Oak Ridge », O. Gourdon, **CIRIMAT**, Toulouse, France, June 17<sup>th</sup> 2008.*
8. *Invited talk entitled « Une nouvelle génération de sources de neutrons pulsées par spallation pour une meilleure compréhension de la matière et de ses propriétés : L'exemple de SNS à Oak Ridge », O. Gourdon, **CEMES**, Toulouse, France, June 19<sup>th</sup> 2008.*
9. *Invited talk entitled « Study of structure-property relationship in novel inorganic compounds with disorder and/or long range order POWGEN3 at SNS, O. Gourdon, **Jülich Institute**, Jülich (Germany), June 25<sup>th</sup> 2008.*
10. *Invited talk entitled « Study of structure-property relationship in novel inorganic compounds with disorder and/or long range order POWGEN3 at SNS”, O. Gourdon, **IMN 2008**, Nantes (France), June 29<sup>th</sup> 2008.*
11. *Invited talk entitled “ Le Diffractionmètre haute résolution POWGEN3 de la source de neutrons pulsée par spallation (SNS) à Oak Ridge National Laboratory (ORNL), O. Gourdon, **AFC 2008**, Rennes, France, July 1<sup>st</sup> 2008.*
12. *Invited talk entitled “ Crystal Structures as weird as they come: From Disorder to Long Range Order”, O. Gourdon, **Hahn-Meitner-Institut, Berlin**, March 9<sup>th</sup> 2007.*

13. *Invited talk entitled* “ Crystal Structures as weird as they come: From Disorder to Long Range Order”, O. Gourdon, **Oak Ridge National Laboratory**, Oak Ridge, TN, March 27<sup>th</sup> 2007.
14. . *Invited talk entitled* “Study of structure-propriety relationship in novel inorganic compounds with disorder and/or long range order”, O. Gourdon, **Hahn-Meitner-Institut**, Berlin, July 2<sup>nd</sup> 2007.
15. *Invited talk entitled* “Study of structure-propriety relationship in novel inorganic compounds with disorder and/or long range order”, O. Gourdon, **Oak Ridge National Laboratory**, Oak Ridge, TN, October 17<sup>th</sup> 2007.
16. *Invited talk entitled* “The coloring problem” in the Cu-Zn  $\gamma$ -brass structure”, O.Gourdon, **2006 American Conference on Neutron Scattering**, St. Charles, IL June 18<sup>th</sup>-21<sup>st</sup>, 2006.
17. *Contributed talk entitled* “Investigation of modulated structures in  $\gamma$ -brass systems using PDF from neutron diffraction, **2006 American Conference on Neutron Scattering, St. Charles**, IL June 18<sup>th</sup>-21<sup>st</sup>, 2006.
18. *Invited talk entitled* “The coloring problem” in the Cu-Zn  $\gamma$ -brass structure”, O.Gourdon, **French Crystallographic Association Meeting**, Toulouse, France, July 10<sup>th</sup>-13<sup>th</sup>, 2006.
19. *Contributed talk entitled* “NPDF: A new high-resolution total scattering powder diffractometer, O.Gourdon, **ICAM/ CINT Workshop**, Santa Fe, November 10<sup>th</sup>, 2006.
20. *Invited talk entitled* “Zn<sub>1-x</sub>Pd<sub>x</sub> (x=0.14 to 0.32) Intergrowth Compounds: Towards 1D Quasicrystal Approximants”, O. Gourdon, **9th International Conference on Quasicrystals**, Ames, IA, May 22<sup>nd</sup> – 26<sup>th</sup>, 2005
21. *Invited talk entitled* “From Crystal to Quasicrystal in binary intermetallic systems”, O.Gourdon, **Mc Gill University, Montréal**, January 28<sup>th</sup>, 2004.
22. *Invited talk entitled* “Electronic charge transfer and atomic modulations in aperiodic intermetallic and chalcogenide compounds” **Mc Gill University, Montréal**, January 29<sup>th</sup>, 2004.
23. *Invited talk entitled* “Du cristal au quasicristal dans des systèmes intermétalliques binaires. » O. Gourdon, **Université de Montréal**, Montréal, April 13<sup>th</sup>, 2004.
24. *Invited talk entitled* “Transfert de charges et modulations atomiques dans les systèmes cristallins apériodiques », O. Gourdon, Université de Montréal, Montréal, April 14<sup>th</sup>, 2004.
25. *Invited talk entitled* “The Use of Crenel Functions in the Description of Aperiodic Perovskite- like A<sub>1+x</sub>BX<sub>3</sub> Oxides and Sulfides, O.Gourdon, **ACA meeting**, Northern Kentucky Convention Center, Covington, Kentucky, July 26 - 31, 2003.
26. *Invited talk entitled* “Du cristal au quasicristal dans des systèmes intermétalliques binaires », O. Gourdon, **Université Laval, Québec**, November 28<sup>th</sup>, 2003.
27. *Contributed talk entitled* “Crystallographic and electronic studies of quasicrystals and approximants in the Ga<sub>x</sub>M<sub>y</sub> (M=Cr,Mn,Fe) system”, O. Gourdon, Inorganic Seminar, **Iowa State University**, Ames, IA, September 30<sup>th</sup> 2002.

⇒**Poster Presentations**

1. Could the  $A_xCr_5X_8$  ( $A = K, Rb$ ;  $X = Se, Te$ ) be half-metallic ferromagnets ?, F. Boucher, O. Gourdon and M. Evain., 12<sup>th</sup> International Conference on Solid Compounds of Transition Elements, Saint-Malo, April 22-25<sup>th</sup>, 1997.

2. Application des fonctions créneaux pour la description de  $Sr_{1.2872}NiO_3$  composé composite incommensurable., Gourdon, F. Boucher, V. Petricek, M. Dusek, P. Bezdicka and M. Evain., AFC 98, Orléans, February 24-27<sup>th</sup>, 1998.

3. A unique distortion in  $K_{1/3}Ba_{2/3}AgTe_2$ . X-ray diffraction determination and electronic band structure analysis of its incommensurately modulated structure, O. Gourdon, Jason Hanko, F. Boucher, V. Petricek, M.-H. Whangbo, M. G. Kanatzidis and M. Evain, EMRS, Symposium P (Crystal Chemistry of Functional Materials), Strasbourg, May 30<sup>th</sup> to June 2<sup>nd</sup>, 2000.

4. The use of crenel functions in the description of the hexagonal perovskite-like  $A_{1+x}BX_3$  oxides and sulfides, Michel Evain, Olivier Gourdon & Vaclav Petricek, APERIODIC 2000, Nijmegen, 4 - 8 July 2000.

5. Study of Stability, Evolution and Structure in the  $Al_{6-y}Cu_{1+z}Li_{3-x}Mg_x$  System, O. Gourdon and G. Miller, Department Of Energy Review, Ames Laboratory, 7-8 May 2001.

6. Superspace-group description of the hexagonal perovskite-like  $Sr_{1+x}MX_3$  oxide and sulfide aperiodic structures, O. Gourdon, Midwest High Temperature & Solid State Chemistry, Fort Collins , CO, June 20-24<sup>th</sup> 2001.

7. Study of Stability, Evolution and Structure in the  $Al_{6-y}Cu_{1+z}Li_{3-x}Mg_x$  System, O. Gourdon and G. Miller, Midwest High Temperature & Solid State Chemistry, Fort Collins, CO, June 20-24<sup>th</sup> 2001.

8. Reinvestigation of the GaMn Structure and Theoretical Studies of its Electronic and Magnetic, Properties O. Gourdon and G. Miller, 34<sup>th</sup> ACS great lakes regional meeting, Minneapolis, MN, June 2-4<sup>th</sup> 2002.

9. Reinvestigation of the GaMn Structure and Theoretical Studies of its Electronic and Magnetic Properties, O. Gourdon and G. Miller, Gordon Research Conference (Solid State Chemistry), Colby Sawyer College, NH, July 28-August2<sup>nd</sup> 2002.

⇒**Chair**

➤ Co-chair of JANA2006 workshop : Incommensurate Structures

O. Gourdon & Jim Kaduk

American Crystallographic Association (ACA) meeting Toronto 2009, July 23-25<sup>th</sup> 2009.

➤Session chair at the ACA 2010 meeting (Chicago): of the session entitled:" Incommensurate modulated materials"

⇒**Complimentary information**

- Reviewer of Journal of Alloys and Compounds, Inorganic Chemistry, Chemistry of Materials and Journal of Solid State Chemistry.
- Member of the Sigma Chi scientific association, Material Research Society (MRS), the Association Française de Cristallographie (AFC), The American Crystallographic Association (ACA) and the Neutron Scattering Society of America (NSSA).
- Organizer of ACA 2009 workshop on modulated structure

- Session chair at the ACA 2010 meeting: of the session entitled :" Incommensurate modulated materials"
- Ph. D. Supervisor of Michael Gottschlich on the Investigation of new Magnetocaloric Effect Materials.